

THE "PADANG" FLORA OF JEMAJA, IN THE ANAMBA ISLANDS, N. E. I.

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During a visit to the Anamba Islands in April 1928, an opportunity was taken to study a peculiar plant association found on the island of Jemaja. Such associations are rather rare in the Malay Archipelago, and are known as "padangs," which seems a convenient term for them in the meantime.

The Jemaja padang is a sandflat on the coast just behind the large bay called Telok Mampoh on the charts, or, more exactly, that part of the bay known locally as Telok Padang. It is about half an hour's walk eastwards of Letong, the principal village in the island.

The Padang is perhaps a mile long, and for the greater part of its length is bordered on the seaward side by a river running parallel to the beach. Between the river and the sea is a narrow strip of cultivated coconut palms. The river makes a wide bend at the northern end of the padang and partly encloses it on the west. On the western edge of the padang are low hills, all cultivated and covered with coconut palms, which extend down into the padang in a straggling fashion, and end where there is swampy ground, which supports a number of sago palms.

The western half of the padang is slightly lower than the eastern, but yet not within the influence of the river at high tides. The river banks support a mangrove vegetation, but this does not extend beyond the actual banks and there is no trace of it in the padang itself. The soil of this lower western half is slightly damper than that of the eastern half, more compact, darker in colour and with a greater admixture of humus. The vegetation is lower and thicker, and there is a dense undergrowth of grasses, sedges and ferns.

The commonest fern—and it is extremely abundant—is *Pteridium aquilinum*, (L) Kuhn, v. *esculentum*, (Forst.), with *Blechnum indicum*, Burm. not quite so abundant and preferring damper spots. The bushes average 5-6 feet tall and are chiefly *Melastoma polyanthum*, Bl., *Rhodomyrtus tomentosa*, Wight, *Baeckia frutescens*, L., *Eugenia zeylanica*, Wight, very conspicuous with its clusters of opaque white fruit, *Archytaea VahlII*, Choisy, and a *Timonius* which has not been properly identified, but which appears to be near

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T. mutabilis, Boerl. *Flagellaria indica*, L., and a few plants of *Nepenthes Reinwardtiana*, Miq. climb over the bushes. A board track led through the padang, bordered by ditches which were almost dry at the time of my visit. In the ditches were found plants of *Utricularia minutissima*, Vahl, and *U. albina*, Ridl.

The eastern part of the padang is a few feet higher than the western and the soil here is a loose, very soft white sand of fine texture, so fine, in fact, that it squeaks underfoot as snow will do on a frosty day. The bushes here are taller, more widely spaced, the undergrowth of ferns and grasses disappears, and the spaces between the bushes are sparsely covered with plants of *Xyris complanata*, R. Br., and such sand-binding, creeping plants as *Hedyotis pinifolia*, Wall., *Mitrasacme polymorpha*, R. Br., *Desmodium trifolium*, Miq., *Merremia tridentata*, Hallier, and *Evolvulus alsinoides*, Linn. The bushes here increase in height to an average of about 15 feet, with some larger trees, and are principally *Baeckia frutescens*, L., *Eugenia zeylanica*, Wight, *Daphniphyllum laurinum*, Baill., *Leucopogon malayanus*, Jack, *Garcinia rostrata*, B. & H., *Rhodamnia cinerea*, Jack, *Vaccinium bancanum*, Miq., var *tenuivenium*, J. J. S. (this was very common), *Podocarpus polystachyus*, R. Br., and *Cycas Rumphii*, Miq. *Ficus diversifolia* is also common, always as a terrestrial bush about 4 feet tall. One common small tree is *Cotylelobium flavum*, Pierre, nearly always bearing fruits at this time. This was collected in jungle on the lower slopes of the hills behind the bay, and is there a tall straight tree with brown bark, while the padang specimens are all low and bushy with whitey-grey bark.

Other species of less frequent occurrence are:—*Vitex pubescens*, Vahl., *Buchanania arborescens*, Bl., *Barringtonia macrostachya*, Kurz, *Eugenia lepidocarpa*, Wall., and small shrubs of *Ardisia crenata*, Roxb. *Cassytha filiformis*, L. twines on bushes of *Leucopogon* and *Baeckia*, and *Dendrothoe curviflora* is sparingly present. *Vitex pubescens* is often infested with *Amyema Beccarii*. Of still less frequent occurrence are *Fagraea auriculata* and plants of *Bromheadia* sp.

Similar associations occur in the Malay Peninsula on the east coast, but they do not seem to be so complex. The “heath” lands of Perlis and Setul are similar in some respects, the similarity being mostly due to the xerophytic character of the vegetation, but those (in Perlis) that I have seen are not so open and sandy as the Jemaja padang, being, in fact, in places, very swampy. The islands of Billiton and Bangka seem also to have somewhat similar “padangs,” according to J. E. Teysmann in *Natuurk.*

Tydschr. Ned. Indie, Ser. VII, vol. 6, (1876), 210-293; to S. Kurz in the same publication, Ser. VI, 2, 148-258; and to Th. Valeton in Verslag van de gewone vergadering der Wis- en Natuurkundige Afdeeling der Kon. Acad. van Wetenschappen, Amsterdam, 1908, 120-126. The description of the "sand-padangs" in the last named publication, although short, indicates that they must be very similar to the sandy part of the Jemaja padang. *Drosera Burmanni*, however, was not found in Jemaja. It is recorded as occurring in the Billiton padangs, and it is found on the Perlis and Setul heaths.

There are distinct differences between the Jemaja padang flora and the flora of the adjacent sandy and rocky beaches. Common to both are *Melastoma polyanthum*, *Rhodomyrtus tomentosa*, *Podocarpus polystachyus*, etc., but *Baeckia frutescens* and *Leucopogon malayanus*, for instance are not found on the beach, while *Guettarda speciosa* and *Scaevola Koenigii* are absent from the padang.

This padang has apparently been interfered with by man to a very small extent. Tracks have been made through it, and possibly a little wood has been cut from the larger bushes or trees, but there has been no attempt at cultivation, and no grazing by cattle. Only one plant was seen which may possibly have been an alien—a fair sized tree of *Mangifera indica*. This was growing at the junction of two main pathways, where it gave a very welcome shade. Towards the southern end coconut palms begin to appear, the outliers of the plantations which surround the padang. It was evident that they were unsuited to the soil conditions and were not thriving, in contrast to the large plants of *Pandanus fascicularis*, Lam., which grew with them.

A list is given below of the plants collected on the padang, as it is thought to be fairly complete. The percentage of plants in flower or fruit, or both, was very much higher than in the nearby jungle.

I am indebted to the Director, Royal Botanic Gardens, Kew, and to the Director, Botanic Gardens, Buitenzorg, for identifications of a number of plants; to Mr. R. E. Holttum for identifications of ferns; and to Dr. C. G. G. J. van Steenis for translations of Teysmann's, Kurz, and Valeton's papers mentioned above.

Plants growing on the lower, damper part of the Padang.

- Archytaea VahlII*, Choisy. Common. Distributed throughout the Malayan Archipelago.
- Baekia frutescens*, Linn. Commoner on the lower and damper spots, but extending into sandier places. W. Malaysia, China, Japan.
- RhodomYrtus tomentosa*, Wight. Common, but not growing very tall. Widely distributed from India to Japan.
- Melastoma polyanthum*, Bl. Common. Distributed through W. Malaysia to the Philippines.
- Timonius* nr. *mutabilis*, Boerl. Not uncommon.
- Ardisia littoralis*, Andr. On the edge of river bordering the padang, hardly belonging to the padang proper. Indo-Malay, Philippines, China.
- Utricularia albina*, Ridl. In ditches by path. Ceylon, Tenasserim, Malay Peninsula.
- Utricularia minutissima*, Vahl. In ditches by path. Apparently not hitherto known outside the Malay Peninsula.
- Clerodendron inerme*, Gaert. On riverbank at edge of padang, not properly in the padang flora. Littoral from Trop. Africa to Polynesia.
- Nepenthes Reinwardtiana*, Miq. Climbing over bushes, not very common. Malay Peninsula, Sumatra, Bangka, Borneo.
- Dianella ensifolia*, Red. Sparingly present. India to Polynesia.
- Flagellaria indica*, Linn. Climbing over low bushes. Trop. Africa and Asia to Australia and Polynesia.
- Fimbristylis pauciflora*, R. Br. S. Asia to Australia.
- Cladium undulatum*, Thw. Ceylon to Malaya and Australia.
- Eragrostis elongata*, Jacq. Trop. Asia to Australia.
- Schizachyrium semberbe*, Nees. America, Africa, Trop. Asia.

(These two sedges and two grasses, along with the following ferns, formed the main part of the dense undergrowth in the damper places).

- Pteridium aquilinum*, Kuhn, v. *esculentum* (Forst). Very common, usually sterile. S. Asia, Australia.
- Blechnum indicum*, Burm. Slightly less common than the *Pteridium*, and preferring somewhat damper places. Trop. Asia and Australia.
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Plants of the higher, sandier part of the padang.

- Garcinia rostrata*, B. & H. Not uncommon. Tenasserim, Malay Peninsula, Borneo, Java.
- Cotylelobium flavum*, Pierre. Common as a small bushy tree. Malaya Peninsula, Borneo.
- Salacia flavescens*, Kurz. Not very common. Tenasserim, Siam, Malay Peninsula.
- Mangifera indica*, Linn. One tree only seen. Doubtfully wild.
- Buchanania arborescens*, Bl. Common. Indo-Malaya to the Philippines.
- Desmodium ?trifoliatum*, Miq. Creeping in dry sand in the open.
- Ormosia bancana*, Prain. Not common. Malay Peninsula, Bangka, Borneo.
- Rhodamnia cinera*, Jack. Common. Siam to Australia.
- Eugenia caudatilimba*, Merr. Not common. Hitherto known only from Sarawak.
- Eugenia claviflora*, Roxb. Not very common. India to Tenasserim and Malay Peninsula.
- Eugenia lepidocarpa*, Wight. Burma, Malay Peninsula, Sumatra.
- Eugenia zeylanica*, Wight. Common. India to Malay Peninsula, Java, Borneo.
- Barringtonia macrostachya*, Kurz. Not very common. Burma, Malay Peninsula, Borneo.
- Pogonanthura pulverulenta*, Bl. Sumatra, Malay Peninsula, Java, Borneo.
- Hedyotis pinifolia*, Wall. Creeping in open places in dry sand. India to W. Malaysia.
- Gynochthodes subanceolata*, Miq. Not very common. Sumatra, Malay Peninsula, Borneo.
- Psychotria viridiflora*, Reinw. Sumatra, Malay Peninsula, Java, Borneo.
- Leucopogon malayanus*, Jack. Common. Malay Peninsula, Bangka, Sumatra, Borneo.
- Vaccinium bancanum*, Miq., var. *tenuivenium*, J. J. S. One of the commonest large bushes. The species in Malay Peninsula, Bangka, Borneo, the var. in Java.
- Ardisia crenata*, Roxb. Not very common. Indo-Malaya, China, Japan.
- Olea maritima*, Wall. Not common. ?Java, Cochinchina.
- Jasminum bifarium*, Wall. Twining on bushes in the open. W. Malaysia to the Philippines.

- Evolvulus alsinoides*, Linn. Creeping in open dry sandy places. Pantropic.
- Merremia tridentata*, Hallier. Creeping in sand between bushes. Africa, India, Malay Peninsula, Bangka.
- Vandellia* aff. *hirsuta*, Bth. In open sandy spots.
- Mitrasacme polymorpha*, R. Br. In open sandy spots. Indo-Malaya, China, Australia.
- Fagraea auriculata*, Jack. Seen occasionally. Malay Peninsula, Java, Philippines, Cambodia.
- Aganosma marginata*, G. Don. Not common. India, Malay Peninsula, Sumatra, Java, Philippines.
- Tylophora villosa*, Bl. Not common. Java.
- Holarrhena pauciflora*, Ridl. Not common. Hitherto known only from S. Siam and the north of the Malay Peninsula.
- Hoya coronaria*, Bl. Twining on bushes in the open. Sumatra and Malay Peninsula to N. Guinea.
- Vitex pubescens*, Vahl. A not infrequent small tree. Indo-Malaya, Philippines.
- Henslowia buxifolia*, Bl. Not very common. Malay Peninsula, Bangka, Borneo.
- Daphniphyllum laurinum*, Baill. Not uncommon. Sumatra, Malay Peninsula, Bangka, Borneo, Java.
- Cassytha filiformis*, Linn. Usually on bushes of *Leucopogon* and *Baekia*. Pantropic.
- Amyema Beccarii*, Dans. Common on *Vitex pubescens*. Malay Peninsula, Borneo.
- Dendrophoe curviflora*, Dans. Not frequent.
- Glochidion rubrum*, Bl. S. Siam, Malay Peninsula, Java Philippines.
- Ficus diversifolia*, Bl., var. *ovoidea*. Common, always as a terrestrial bush about 4 ft. tall. Malay Peninsula and Archipelago.
- Bromheadia* sp. An occasional plant seen.
- Xyris anceps*, Lam. Sparsely covering open dry sandy places. India to Malaya.
- Pandanus fascicularis*, Lam. Common in one place only. Mauritius, Trop. Asia.
- Cycas Rumphii*, Miq. Not uncommon. Nicobar Islands and Tenasserim to Australia.
- Podocarpus polystachyus*, R. Br. Not uncommon. Sumatra, Malay Peninsula, Borneo, Philippines.
- Cyclophorus acrostichoides*, (Forst.) Pr. On *Eugenia* sp. Ceylon, Malaysia to Polynesia.
- Davallia denticulata*, (Burm.) Mett. Under bushes, but not in deep shade. Madagascar to Polynesia.

Polypodium phymatodes, L. At bases of bushes, in shade. Old World Tropics.

Schizaea dichotoma, (L.) Sm. Under bushes, but not in deep shade. Madagascar to Polynesia.

Leucophanes densifolium, Mitt. Not abundant, but occurring in large tufts. Malaysia to Polynesia.

HALOPHILA SPINULOSA (R.Br.) Aschers.

Up to the present only one species of *Halophila* (*H. ovata*, Gaud.) has been recorded from the shallow seas round the coasts of the Malay Peninsula. Recently, however, *Halophila spinulosa* has been found. It was first collected by Mr. R. E. Holtum in shallow water at low tide off Pulau Ubin. Later, while dredging in about five fathoms off Pulau Tekong, in the same vicinity, the writer found it growing in mud. In November, 1930, it was collected by Mohamed Nur on the coast of Pulau Penyangat, in the Rhio Archipelago. Specimens of this gathering were sent to Dr. Beumée of the Botanic Gardens at Buitenzorg, Java, who identified it and remarked that this was the first time it had been collected in the Rhio Archipelago.

It does not appear to be common, having been recorded only from the Sunda Straits, the Philippines, and a few places on the coast of Queensland. The Singapore and Rhio specimens are all sterile, and all were found growing in mud. One at least of the Australian specimens is said to have been collected on coral reefs.

It is probable that it is not so rare as the scarcity of collections indicate. It is a submarine plant, probably never exposed even at low tide, and it is small and inconspicuous.

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